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Acrylic Solution Pressure Sensitive Adhesive

DURO-TAK® 387-2054 / 87-2054

DESCRIPTION

DURO-TAK 387-2054 / 87-2054 is an acrylate-vinylacetate self-curing pressure sensitive adhesive supplied in an organic solvent solution.

TYPICAL APPLICATIONS

Transdermal drug delivery systems

TYPICAL PHYSICAL PROPERTIES*

Test Method	Common	Metric
Solids content	47.5 %	
Viscosity – Brookfield (25°C, #21, 10rpm, SSA)	2750 cPs 2750 mPa·s	
Relative Viscosity (20°C)	2.7	
Solvent Composition (% of total solvent)	Ethyl acetate 36 % Isopropanol 36 % Heptane 24 % Toluene 4 % 2,4-Pentanedione <1 %	
Tg (theoretical)	-50°C	
Appearance Solution	Clear, slightly yellow liquid	
Dried thin film	Clear, colorless	

TYPICAL PERFORMANCE PROPERTIES*

Test Method	Common	Metric
180° Peel 20 minutes	40 oz/in	11 N/25mm
24 hours	50 oz/in	13 N/25mm
1 week	60 oz/in	17 N/25mm
Shear (22°C)	(4 psi) 40 hours	(1 kg, 2.5-1.26cm) 40 hours
Tack (Loop)	45 oz/in ²	16 N/25mm ²

* Typical Properties are provided as guidelines only - this data should not be used for setting specifications.

SAFETY TESTING

As an indication of the suitability of these products for skin contact use, National provides results from the following safety testing:

- Cytotoxicity (USP MEM Elution Method) – Non-cytotoxic
- Primary Dermal Irritation – 0.29
- Buehler Sensitization – Non-sensitizing
- USP Class VI – Meets USP requirements.

REGULATORY STATUS

- FDA Drug Master File: DMF# 4571 – FDA will review this information for you upon receipt of an authorization letter from National Starch & Chemical. Outside the USA, the DMF information is compiled into a confidential "Applicant's Information Package" (AIP).

➤ FDA Food Contact Status

Dry film components comply with the following FDA Indirect Food Additive Regulations:

- 21 CFR 175.105 "Adhesives"
- 21 CFR 176.180** "Components of paper and paperboard in contact with dry food"
- 21 CFR 176.170** (paragraph b)

"Components of paper and paperboard in contact with aqueous or fatty food.

** subject to extractive limitations of the regulation.

STORAGE & SUGGESTED USABLE LIFE

Store drums in a dry area and keep them tightly covered to prevent solvent loss or contamination. The suggested usable life of DURO-TAK 387-2054 / 87-2054 is 12 months from the date of manufacture in unopened containers. For more details, please review the DURO-TAK Product Life document.

PRECAUTIONS

Review the MSDS carefully. Mix well before use. If dilution is required, ethyl acetate (low moisture content) is suggested.

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The information given and the recommendations made herein are based on our research and are believed to be accurate but no guarantee of their accuracy is made. In every case we urge and recommend that purchasers before using any product in full scale production make their own tests to determine to their own satisfaction whether the product is of acceptable quality and is suitable for their particular purposes under their own operating conditions. No representative of ours has any authority to waive or change the foregoing provisions but, subject to such provisions, our engineers are available to assist purchasers in adapting our products to their needs and to the circumstances prevailing in their business. Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without the authority from the owner of this patent. We also expect purchasers to use our products in accordance with the guiding principles of the Chemical Manufacturers Association's Responsible Care® program.

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**Acrylic Solution
Pressure Sensitive Adhesive**

DURO-TAK® 387-2052 / 87-2052

DESCRIPTION

DURO-TAK 387-2052 / 87-2052 is an acrylate-vinylacetate self-curing pressure sensitive adhesive supplied in an organic solvent solution.

TYPICAL APPLICATIONS

Transdermal drug delivery systems

TYPICAL PHYSICAL PROPERTIES*

Test Method	Common	Metric
Solids content	47.5 %	
Viscosity – Brookfield (25°C, #21, 10 rpm, SSA)	2750 cPs 2750 mPa·s	
Relative Viscosity (20°C)	2.7	
Solvent Composition (% of total solvent)	Ethyl acetate 39 % Isopropanol 27 % Ethanol 22 % Heptane 12 %	
Tg (theoretical)	-50°C	
Appearance Solution	Clear, slightly yellow liquid	
Dried thin film	Clear, colorless	

TYPICAL PERFORMANCE PROPERTIES*

Test Method	Common	Metric
180° Peel 20 minutes	40 oz/in	11 N/25mm
24 hours	50 oz/in	13 N/25mm
1 week	60 oz/in	17 N/25mm
Shear (22°C)	(4 psi) 40 hours	(1 kg, 2.5-1.25cm) 40 hours
Tack (Loop)	45 oz/in ²	16 N/25mm ²

* Typical Properties are provided as guidelines only - this data should not be used for setting specifications.

SAFETY TESTING

As an indication of the suitability of these products for skin contact use, National provides results from the following safety testing:

- Cytotoxicity (USP MEM Elution Method) – Non-cytotoxic
- Primary Dermal Irritation – 0.46
- Buehler Sensitization – Non-sensitizing
- USP Class VI – Meets USP requirements.

REGULATORY STATUS

- FDA Drug Master File: DMF# 7477 – FDA will review this information for you upon receipt of an authorization letter from National Starch & Chemical. Outside the USA, the DMF information is compiled into a confidential "Applicant's Information Package" (AIP).

- FDA Food Contact Status
Dry film components comply with the following FDA Indirect Food Additive Regulations:
 - 21 CFR 175.105 "Adhesives"
 - 21 CFR 176.180** "Components of paper and paperboard in contact with dry food"
 - 21 CFR 176.170** (paragraph-b)
"Components of paper and paperboard in contact with aqueous or fatty food."

** subject to extractive limitations of the regulation.

STORAGE & SUGGESTED USABLE LIFE

Store drums in a dry area and keep them tightly covered to prevent solvent loss or contamination. The suggested usable life of DURO-TAK 387-2052 / 87-2052 is 12 months from the date of manufacture in unopened containers. For more details, please review the DURO-TAK Product Life document.

PRECAUTIONS

Review the MSDS carefully. Mix well before use. If dilution is required, ethyl acetate (low moisture content) is suggested.

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Acrylic Solution Pressure Sensitive Adhesive

DURO-TAK® 387-2287 / 87-2287

DESCRIPTION

DURO-TAK 387-2287 / 87-2287 is an acrylate-vinylacetate non-curing pressure sensitive adhesive supplied in an organic solvent solution.

TYPICAL APPLICATIONS

Transdermal drug delivery systems

TYPICAL PHYSICAL PROPERTIES*

Test Method	Common		Metric
Solids content	50.5 %		
Viscosity – Brookfield (25°C, #27, 10rpm, SSA)	18000 cPs	18000 mPa·s	
Relative Viscosity (20°C)	3.6		
Solvent Composition (% of total solvent)	Ethyl acetate	100 %	
Tg (theoretical)	-35°C		
Appearance Solution	Clear, slightly haze liquid		
Dried thin film	Clear, colorless		

TYPICAL PERFORMANCE PROPERTIES*

Test Method	Common	Metric
180° Peel 20 minutes	50 oz/in	14 N/25mm
24 hours	55 oz/in	15 N/25mm
1 week	60 oz/in	17 N/25mm
Shear (22°C)	(2 psi) 2 hours	(0.5 kg, 2.5-1.25cm) 2 hours
Tack (Loop)	45 oz/in ²	12 N/25mm ²

* Typical Properties are provided as guidelines only - this data should not be used for setting specifications.

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The information given and the recommendations made herein are based on our research and are believed to be accurate but no guarantee of their accuracy is made. In every case we urge and recommend that purchasers before using any product in full scale production make their own tests to determine to their own satisfaction whether the product is of acceptable quality and is suitable for their particular purposes under their own operating conditions. No representative of ours has any authority to waive or change the foregoing provisions but, subject to such provisions, our engineers are available to assist purchasers in adapting our products to their needs and to the circumstances prevailing in their business. Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without the authority from the owner of this patent. We also expect purchasers to use our products in accordance with the guiding principles of the Chemical Manufacturers Association's Responsible Care® program.

ADHESIVE FEATURES

- Can be used as a tackifier for other acrylic solution PSA's
- Soft, non-curing adhesive

SAFETY TESTING

As an indication of the suitability of these products for skin contact use, National provides results from the following safety testing:

- Cytotoxicity (USP MEM Elution Method) – Non-cytotoxic
- Primary Dermal Irritation ~ 1.7
- Buehler Sensitization – Non-sensitizing
- USP Class VI – Meets USP requirements.

REGULATORY STATUS

- FDA Drug Master File : DMF# 7477 – FDA will review this information for you upon receipt of an authorization letter from National Starch & Chemical. Outside the USA, the DMF information is compiled into a confidential "Applicant's Information Package" (AIP).

- FDA Food Contact Status
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- 21 CFR 175.105 "Adhesives"
- 21 CFR 176.180** "Components of paper and paperboard in contact with dry food"
- 21 CFR 176.170** (paragraph b)
"Components of paper and paperboard in contact with aqueous or fatty food."
** subject to extractive limitations of the regulation.

STORAGE & SUGGESTED USABLE LIFE

Store drums in a dry area and keep them tightly covered to prevent solvent loss or contamination. The suggested usable life of DURO-TAK 387-2287 / 87-2287 is 12 months from the date of manufacture in unopened containers. For more details, please review the DURO-TAK Product Life document.

PRECAUTIONS

Review the MSDS carefully. Mix well before use. If dilution is required, ethyl acetate (low moisture content) is suggested.

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Technical InformationT/ES 1410 US
April 2003

Superseded edition dated April 1999

® = Registered trademark of
BASF Aktiengesellschaft**Oppanol® B types****Oppanol B 30 SF
Oppanol B 50 / B 50 SF
Oppanol B 80**

These Oppanol B types are used for producing adhesives, sealants, lubricating oils, coating compounds, and chewing gum. They are also recommended for modifying bitumen.

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Other properties	Oppanol B type	30	50	80
Relative molecular mass $M_v^{(1)}$ (viscosity averages)	200000	400000	800000	
Relative molecular mass $M_n^{(2)}$ (number averages)	73000	120000	200000	
Glass temperature T_g °C (DSC)	-64	-63	-63	

¹⁾ The viscosity average of the relative molecular mass is calculated as follows:

$$M_v = \frac{0.85}{3.08} \sqrt{\frac{J_0 \times 10^2}{}}^1$$

²⁾ The number average of the relative molecular mass is calculated as follows:

$$M_n = \frac{0.94}{2.27} \sqrt{\frac{J_0 \times 10^3}{}}^1$$

Properties that are independent of the relative molecular mass

	Unit	Value
Density at 20 °C	g·cm ⁻³	0.92
Thermal coefficient of cubic expansion at 23 °C	K ⁻¹	6.3 · 10 ⁻⁴
Specific heat c	J·kg ⁻¹ ·K ⁻¹	2.0
Thermal conductivity λ	W·K ⁻¹ ·m ⁻¹	0.19
Refractive index n _D ²⁰		1.61
Dielectric constant ε _r (50 Hz, 23 °C) DIN 53483		2.2
Dissipation factor tan δ (50 Hz, 23 °C)		≤ 5 · 10 ⁻⁴
Volume resistivity	Ω·cm	10 ¹⁶
Water-vapour permeation coefficient	g·m ⁻¹ ·h ⁻¹ ·mbar ⁻¹	2.6 · 10 ⁻⁷

Viscosity

The Oppanol B types exhibit cold flow dependent on the relative molecular mass. As a result of chain entanglements, the molecular network in high-molecular-weight Oppanol B is similar to that of crosslinked rubber. The network of polyisobutene is not held together by chemical bonds, and it yields under sustained loads as the chain becomes disentangled. Under sustained loads, high-molecular-weight Oppanol B behaves like a liquid, or in other words, it undergoes plastic deformation.

High-molecular-weight polyisobutene has the same viscoelastic behaviour as a molten polymer.

Solubility

Oppanol B is soluble in aliphatic, aromatic, cyclic, and halogenated hydrocarbons. It is swollen by alcohols, ethers, esters, and ketones, the extent of swelling increasing with the length of the hydrocarbon chain.

The rate at which Oppanol B is dissolved or swollen by homologous solvents is inversely proportional to the molecular mass of the solvent (rate of swelling in pentane > in mineral spirit b.p. 65–95 °C > in mineral spirit b.p. 150–200 °C > in diesel oil.)

The viscosity of middle and high-molecular-weight polyisobutene solutions in various solvents varies widely owing to the differences in the degree of solvation.